
Why Build A USGA Specification Putting Green?

By Mike Handrich
Racine Country Club

Editor's Note: Confronted with the prospect (and challenge) of building a new green, Racine Country Club's golf course superintendent Mike Handrich knew USGA putting green construction specifications needed to be used. His task was to explain that conviction to club officials.

This well-written piece presented to them by Mike permitted wise decision-making by the club. It's worth sharing.

As in anything, there are many different methods of constructing putting greens. Of these, the USGA method is accepted as the most successful. It has been refined and tested for a number of years and, if all the proper steps are followed in sequence, the result will be a correctly built green that should last for many years.

Every year, golf courses all over the world spend millions of dollars on putting green construction and/or reconstruction. Alarming, many of these new greens fail within the first few years of existence for a variety of reasons.

Due to limited budgets, knowledge, and equipment, early golf greens were a far cry from the finely manicured putting surfaces we expect today. Almost all putting greens built before 1960 used native soils found within a few yards of the construction site. Many times, these soils were poor structurally or texturally. Subsoils were frequently used for the root zone mix, and surface drainage systems were rare.

The most frequent end result was a green where optimum turfgrass growth was unobtainable even under ideal conditions. When subjected to water and heat stress the greens would become weak and extremely susceptible to disease. Add compaction and large numbers of golfers and frequently these native soil greens turned into quagmires or hardpans.

In 1960, after much research and testing, the USGA published an article titled "Specifications for a Method of Putting Green Construction." These specifications were radical changes from the accepted norms for root zone mix which at the time called for equal parts of sand, soil, and organic ma-

terials. The theoretical basis for the USGA green construction method is to provide a compaction resistant growth medium that could drain down quickly to an optimum soil moisture level. The most basic principal learned in soil science is that sands compact less than soils and that coarse sand holds less water against gravity than do fine sands.

The USGA specifications call for individual layers composed of sand, soil, and organic matter. They are mixed in scientifically determined ratios to insure desirable physical soil characteristics. They also are based on scientific data relating to water movement in soils, the physical properties of soils, and causes of compaction and poor internal drainage. The key to this type of green is a "perched water table" caused by the installation of texturally different layers.

In order for you to understand how and why the USGA putting green works you must first understand the principle of a perched water table. Soil physics tells us that water will not move from a small hole or pore into a large pore unless there is enough free water to break the force of capillarity. Capillarity is defined as the attraction or repulsion between surfaces of a liquid. The best example I can think of to explain this phenomenon is with a household sponge. A sponge can absorb free water until it becomes saturated. Then for each additional drop of water added to the top of the sponge, a free drop of water will run out the bottom.

If you look at the edge of a thick sponge you will see more water in the

lower portion than in the top due to gravity. This is known as the "perched water table effect" saturated conditions at the bottom of the soil profile and near optimum growing conditions at the top.

The top layer of a USGA green is like a 12-inch thick sponge. When the green is saturated by rain, the water is allowed to drain down from the putting surface to an acceptable soil moisture level. Immediately below the top layer in the USGA green is a two- to four-inch layer of sand coarser in texture. This is like another thinner sponge but with bigger holes. Under that, you place a four-inch layer of gravel, and essentially what you would have is a USGA green.

If you saturated this system and allowed it to drain down, you would find that the surface of the top layer is at an optimum soil moisture level to grow turf. Water is being conserved and available to the plant from the perched water table with the layers of fine pores overlying the large pores.

A USGA green must be precisely engineered and allows for little or no construction error. It requires additional construction steps and more hand labor than other less sophisticated methods. The sand, soil, and organic matter composition of the individual layers must be laboratory checked and rechecked to insure accuracy. Corners cannot be cut.

Generally, in the Midwest, the cost of a contractor installed USGA construction method green is \$4 per square foot. This is about 20 percent higher than for less sophisticated methods. With proper planning, excessive construction costs are completely unnecessary. A properly built green is always the least expensive in the long run. Only greens that are poorly built are expensive.

I believe that the golfing green is the most delicate playing surface in all of sports today. To compromise on the construction of any green at your club would not be in the best interests of your membership. Rather build a USGA specification green that you and your members and guests alike will enjoy for years to come.

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